Common Clinical Biomarkers in Acute Care Settings

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	Procalcitonin (PCT)	D-dimer	B-type natriuretic peptide (BNP) / N-terminal pro-BNP (NT-proBNP)	Lactate dehydrogenase (LDH)	C-reactive protein (CRP)	Creatine kinase (CK)	Troponin (cTnI)
Pathophysiology	Toxins and cytokines associated with **bacterial infection** can increase the production of PCT in various tissues. Procalcitonin production is generally **not** induced in **viral infections**.	D-dimer is released as a byproduct when a formed **fibrin clot** is **broken down**.	**Stretching of heart muscle** (mainly ventricular wall) leads to synthesis of pre-proBNP, which is ultimately processed to yield BNP and NT-proBNP in equal proportions.	LDH is an enzyme involved in the anaerobic metabolism pathway and is present in most tissue types. **Damaged tissue releases cellular LDH**, which can be measured in the serum.	CRP is produced in the liver in response to **inflammation**. CRP has various binding activities that contribute to the body's clearance of pathogens.	CK is an enzyme that catalyzes the phosphorylation of creatine with ATP. CK leaks into the circulation upon **muscular/tissue damage**. There are 3 isozymes: 1. **CK-MM** (mainly in skeletal muscle) 2. **CK-MB** (mainly in heart muscle) 3. **CK-BB** (mainly in brain tissue)	Troponin is a contraction-regulating protein found in **cardiac muscle cells**. One subunit, **cardiac troponin I (cTnI)**, is **only** found in cardiac muscle. This subunit is released into the blood upon damage to the myocardium.
Reference Value*	≤ 0.15 ng/mL *(adults and children 72 hours or older)*	≤ 500 ng/mL fibrinogen equivalent units (FEU)	≤ 93-167 pg/ml (BNP) ≤ 300 pg/mL (NT-proBNP) ***Note:*** *significantly varies by age and sex*	122-222 units/L for adults ***Note:*** *significantly varies by age*	≤ 8.0 mg/L	39-308 units/L (males) 26-192 units/L (females) ***Note:*** *total CK values, patients 3 months or older*	≤ 20 ng/L (adult males) ≤ 15 ng/L (adult females) ***Note:*** *based on high sensitivity test*
Interpretation	Elevated level can indicate **bacterial infection** (e.g., sepsis)	Elevated level can indicate a **clotting disorder** (e.g., DVT, PE)	Elevated level can indicate **congestive heart failure**	Elevated level can indicate **tissue damage** in various organs (e.g., heart, liver, kidneys); LDH can be used to monitor **anemia**, **hemolysis, liver disease**, **lung disease**, and certain kinds of **infection**	Elevated level can indicate **inflammatory response**	Elevated level can indicate **damage in skeletal muscles, cardiac muscles, or the brain**. Examples include **rhabdomyolysis** or **muscular dystrophy**. Due to tissue specificity, CK is **not** as useful in detecting **heart attacks** anymore.	Elevated level can indicate **damage to the cardiac muscle.** One of the most prominent uses of this biomarker is **detection of myocardial infarction**.

The reference values and ranges listed in this table are **examples of commonly recognized values; in practice, clinicians should refer to values and ranges **specific to their institution/laboratory***

Reference

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